

Dictionary of Food Starch Terms

**A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z**

[Close Window](#)**-F-**

Farina – Another name for potato starch.

Fat: See Lipids

Fiber - Term used in the starch industry to describe the predominantly cellulosic material present in corn husks.

Film properties - Solutions of starch and its derivatives that form films when spread on a plane surface and dried. Starch film properties depend on the type of starch used and the presence of any chemical substituents. Hydrolyzed starch is particularly suitable for film applications as its low viscosity permits cooking at higher concentrations than unmodified starch. There is less water to evaporate in drying so the development of tack and adhesion occur more quickly than with unmodified starches.

Flash dryer – Circular dryer with very fast drying action where the wet material is conveyed by the flow of hot drying air.

Fluidity - Fluidity is the inverse of viscosity. The higher the number, the more hydrolyzed the starch. Water has a value of 100. Thin-boiling starches used in candy are in the range of 60 to 75. Oxidized and acid-thinned starches, and dextrans are all manufactured to various fluidity values.

Flowability - The flowability is the tendency of a powder to flow freely from a container or funnel. Some compounds are used as additives to improve powder flowability e.g. calcium triphosphate.

Food starch - This term denotes any starch, native or modified, which is used or permitted for use in food applications. All native starches are allowed for use in food, but the range of chemically-modified starch for food use is restricted. European legislation applies in European countries and the FDA has developed legislation for the USA.

Food Starch-Modified – The term used to declare modified starches on food labels in the U.S.A.

Freeze-thaw stability - The ability of a starch paste or food composition containing starch or modified starch to maintain its integrity without syneresis when subjected to repeated thermal cycling between ambient and freezing temperatures. Freeze-thaw stability is imparted to starches by substitution with monofunctional reagents. Starch ethers, e.g. hydroxypropyl starches, are particularly suitable for food applications requiring freeze-thaw stability. Acetylated starches are also used for this purpose.

Dictionary of Food Starch Terms

**A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z**

Close Window**-M-**

Maize germ cake - Residue left after the removal of oil from maize germ.

Maize gluten feed - A by-product of the corn wet milling process consisting of fiber, gluten, starch, and a small amount of oil.

Maize gluten meal - A by-product of the corn wet milling process consisting of the same ingredients as maize gluten feed (fiber, gluten, starch, and a small amount of oil) but with a higher level of gluten.

Maize starch - Starch extracted from the various species of the genus *Zea mays* Linnaeus. This type of starch is also known as corn starch.

Maltodextrin - Starch hydrolysis product generally having a Dextrose Equivalent (DE) between 5 and 20 usually produced by the action of an amylase enzyme on gelatinized starch. Maltodextrin contains a range of non-sweet polysaccharides with a distribution of molecular weights where the anhydroglucose units are linked predominantly by 1,4 bonds.

Maltose - Disaccharide of general formula $C_{12}H_{22}O_{11}$ composed of two molecules of D-glucose joined by a 1,4 link. Maltose is less sweet than glucose and is a major component of high and very high maltose syrups used in confectionery and other food applications.

Maltose syrup - A general term used to describe syrups containing high maltose levels.

Manioc starch: See Tapioca starch.

Modified starch - Starch which has been treated physically or chemically to modify one or more of its key physical or chemical properties. see Chemically and physically modified starch entries. This term is used to declare starches on food labels in certain European countries.

Moisture content - The moisture content at which commercial starches are sold is related to the natural equilibrium moisture content of the particular starch. For example corn starch is usually supplied at 11% - 13% moisture whereas potato starch has 18% - 20% moisture. Low moisture starches are available to meet specific requirements with moisture contents below these levels, and special packaging is needed to avoid moisture pick-up from the atmosphere.

Molecular weight - This is the average molecular weight used to characterize natural and synthetic polymers. It reflects the average number of units in the starch polymer chains.

Monostarch phosphate - Modified starch with phosphate ester groups without crosslinking. It is made by heating a mixture of starch with phosphoric acid, sodium or potassium phosphate, or sodium tripolyphosphate. Potato starch already contains a low level of naturally-occurring monophosphate groups giving it a slightly anionic character.

Morphology - The morphology of a material is concerned with the different

Dictionary of Food Starch Terms

A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z

Close Window**-N-**

Native starch - Starch recovered in the original form (i.e. unmodified) by extraction from any starch-bearing material. Often used to distinguish unmodified starch from starch which has undergone physical or chemical modification. More recently, new types of native starches have been developed with many of the properties of modified food starches.

Newtonian - A rheological term; as a Newtonian material undergoes deformation (flow) the ratio of shear stress (applied force) to shear rate (flow or deformation) remains constant.

Non-Newtonian - Non-Newtonian is a rheological term used to describe materials whose rheological behavior deviates from Newtonian response as defined above.

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Dictionary of Food Starch Terms

**A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z**

[Close Window](#)**-P-**

Particle size - Usually expressed as a particle size distribution giving the full range particle sizes found in the sample.

Pasting temperature - The temperature at which the viscosity curve produced in the Brabender viscograph leaves the baseline as the temperature rises during the initial heating process.

Peak viscosity - The highest viscosity reached during the gelatinization of starch usually corresponding to the point where all the granules are swollen to their maximum level. This figure is easily read from a Brabender viscosity curve

Pearl starch - A term referring to the physical form of starches dried in the old kiln type dryers which preceded the flash dryer in common use today.

Percentage substitution - This refers to the level of chemical substitution in a chemically modified starch expressed as weight of the substituent as a percent of total starch weight (anhydrous).

pH - The negative logarithm (base 10) of the hydrogen ion concentration in solution. Universally used as a scale (from 0 to 14) as a measure of acidity (which increases from pH7 to pH0), and of alkalinity (which increases from pH7 to pH 14). pH7 is neutral and represents the pH of pure water.

Phosphorylated starches - Another term for monostarch phosphate where a starch has been substituted with anionic phosphate groups.

Physically-modified starch - Starch which has been physically treated by the manufacturer without the introduction of new chemical groupings. Examples of physical modification include drum-drying, extrusion, spray drying, heat/moisture treatment etc. Physically modified starches have a 'cleaner' image than chemically-modified starch particularly in the food industry.

Plate heat exchanger - A piece of equipment used to heat low-viscosity fluids in the food industry. It consists of a series of plates that allow a heated fluid (steam) to indirectly heat the food product continuously.

Polyols - Polyols are sugar alcohols: this means that they are sugars to which one or more molecular groups containing an oxygen and a hydrogen atom have been added. They are produced by the catalytic hydrogenation of carbohydrates such as glucose syrups or dextrose.

Polysaccharide - A general term used to describe a polymer built from the anhydroglucose building block. Examples include amylose, amylopectin and other hydrocolloids.

Potato starch - Starch from the species *Solanum tuberosum* Linnaeus. Obtained commercially by wet milling using a process known as 'rasping.' Potato starch granules are large, extending up to about 100 microns in diameter. This starch has a low gelatinization temperature and is quite